MiniChef™ 2000

Applications 24 & 25

Timer Applications Guide

Programming & Operating Steps

WATLOW

CE 97

TOTAL CUSTOMER SATISFACTION

ISO 9001 Registered Company Winona, Minnesota USA

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Application 24
Automatic Timer

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Application 24 allows you to program six concurrent timers.

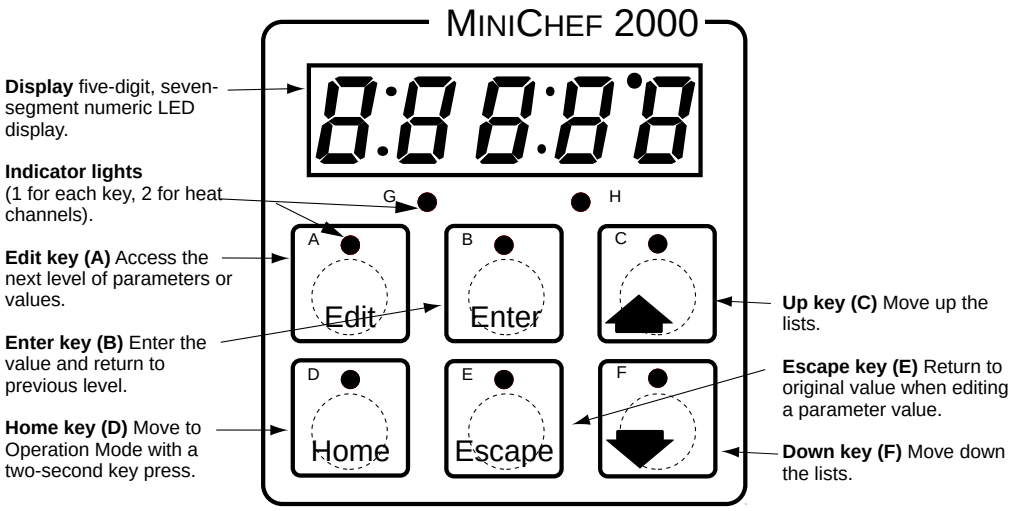
Overview of Key Steps

1. Install the MINICHEF 2000.
2. Wire the controller.
3. Configure the controller.
4. Program the menus.
5. Set the controller security.
6. Set the Real-time Clock.

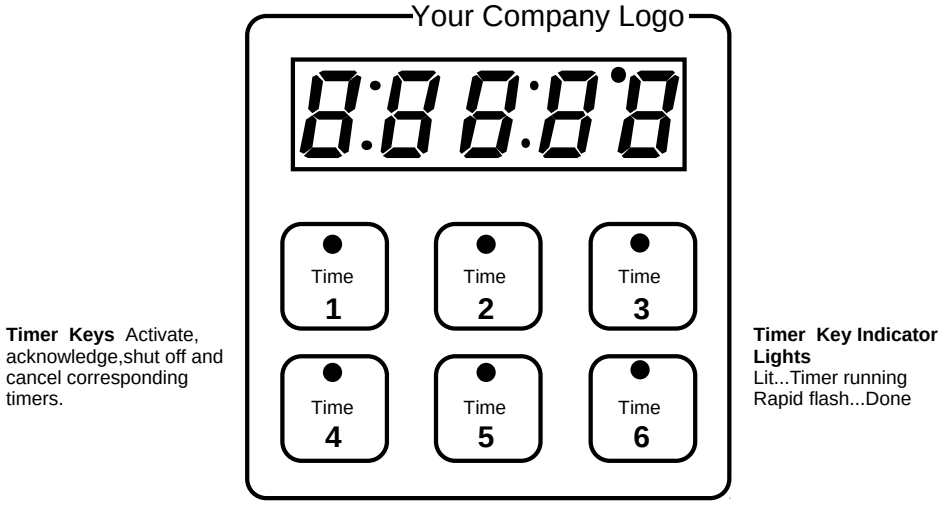
For instructions on Steps 1, 2, 3, 4, 5 and 6, see the *Hardware & Software Setup Guide*.

7. Design, manufacture and apply faceplate overlay for end-users. (For a suggested design to suit this application, see this section. For overlay dimensions and guidelines, see the *Hardware & Software Setup Guide*.)
8. Operate the controller. (See this application guide.)

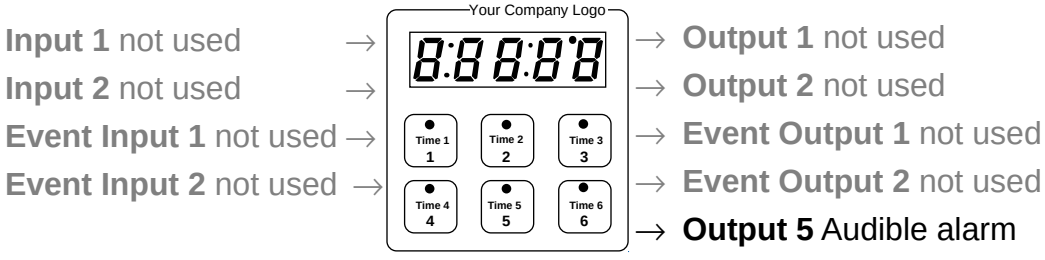
Key Functions in Configuration Mode


MINICHEF 2000
Display five-digit, seven-segment numeric LED display.
Indicator lights (1 for each key, 2 for heat channels).
Edit key (A) Access the next level of parameters or values.
Enter key (B) Enter the value and return to previous level.
Home key (D) Move to Operation Mode with a two-second key press.
G
H
A
B
C
D
E
F
Edit
Enter
Home
Escape
Up key (C) Move up the lists.
Escape key (E) Return to original value when editing a parameter value.
Down key (F) Move down the lists.

Key Functions in Operation Mode



Summary of Input/Output Functions



Note: For details, see wiring instructions in the *Hardware & Software Setup Guide.*

Configuration Mode Quick Reference

These are the functions, parameters and values included in the Configuration Mode for this application. You must select Application 24 to access them. For directions, see the *Hardware & Software Setup Guide*. The Appendix of that guide includes an explanation of all parameters and values.

Function	Parameter	Value	Your Settings
ETYPE Equipment-Type	APPL Application Number	1 - 28	24
	A_Loc Application Number Security Lock	Yes, No	
SEtUP Setup	t.FMt Time Display Format	MMM:SS, HH:MM, H:MM:SS	
	ChirP Key Chirp	On, Off	
	Loc Menu Security Lock	Yes, No	
	CLoc Real Time Clock Display	Yes, No	
diAG WatHelp Diagnostics	Used for equipment troubleshooting and testing. Not used when programming. See the *Hardware & Software Setup Guide.*		

Program Mode Quick Reference

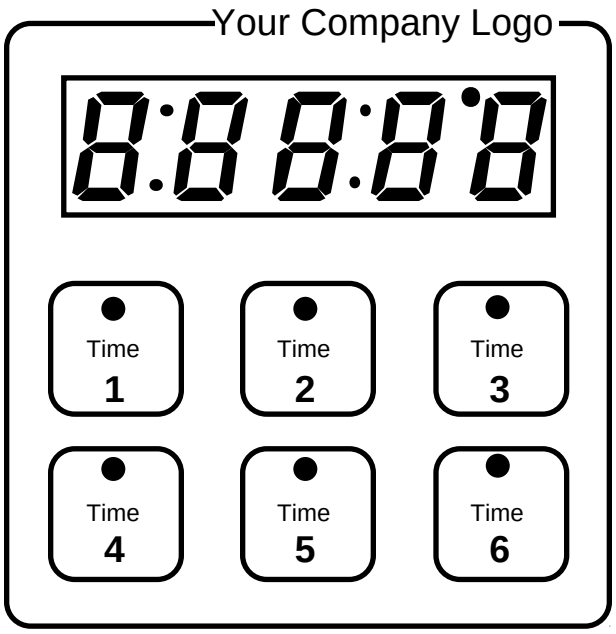
These are the functions, parameters and values included in the Program Mode for this application. You must select Application 24 to access them.. For menu programming directions, see the *Hardware & Software Setup Guide*. The Appendix of that guide includes a detailed explanation of all parameters and values.

Function	Parameter	Value	Your Settings
Menu Numbers 1 - 6	Time 1 Run time of menu.	Format varies based on configuration.	

Step 7 Design a Faceplate Overlay

To complete the installation, you must apply a graphic membrane to the front panel of the controller. The following artwork will help you design and create a membrane for this application. For more dimensions and guidelines, see the *Hardware & Software Setup Guide.*

Suggested End-user Overlay:



This Prototyping and Training Membrane Overlay will help you with the configuration and programming steps. To order it, see the Ordering Information at the back of this guide.

Step 8 Operate the Controller

Summary of Key Functions in Operation Mode

Key	Function
A	Time 1
B	Time 2
C	Time 3
D	Time 4
E	Time 5
F	Time 6

Startup

Apply power to the controller.

idLE will appear on the display.

If the Real-time Clock Display option is installed and SEtuP / CLoc is set to YES, the time of day will appear on the display.

Run a Timer

1. With idLE on the display, press the key for the timer that you want to run. If a timer is currently running you may activate another timer by pressing the key for that timer. Any combination of timers may be running simultaneously. When the controller is running multiple timers the timer with shortest countdown time will be displayed.
2. When a timer has completed End will appear on the display, the timer key indicator light will flash rapidly, and an alarm will sound until the timer key is pressed to acknowledge and shut off that timer.
3. To run another timer repeat steps 1 and 2.

Note: The controller will not respond if you select an invalid timer (one for which Time 1 is set to 0).

Cancel a Timer

Canceling a timer stops that timer only. The other running timers will continue to run.

- Press the active timer key for 2 seconds.

Restart Timer

Press the key(s) for the timer(s) you want to run at any time.

Errors

The controller will alert you to errors if they occur. Errors are critical problems that shut down the unit. If an error occurs, an error message will appear on the display. You should switch off the power and call for service.

See the Appendix in the *Hardware & Software Setup Guide* for a summary of errors.

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Application 25
Manual Timer

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Manual Timer

Application 25 is a timer, controlling no temperature zones, and controlling one timer.

Overview of Key Steps

1. Install the MINICHEF 2000.
2. Wire the controller.
3. Configure the controller.
4. Program the menu.
5. Set the controller security.
6. Set the Real-time Clock.

For instructions on Steps 1, 2, 3, 4, 5 and 6, see the *Hardware & Software Setup Guide*.

7. Design, manufacture and apply faceplate overlay for end-users. (For a suggested design to suit this application, see this section. For overlay dimensions and guidelines, see the *Hardware & Software Setup Guide*.)
8. Operate the controller. (See this application guide.)

Key Functions in Configuration Mode

MINICHEF 2000
Display five-digit, seven-segment numeric LED display.
Indicator lights (1 for each key, 2 for heat channels).
Edit key (A) Access the next level of parameters or values.
Enter key (B) Enter the value and return to previous level.
Home key (D) Move to Operation Mode with a two-second key press.
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Up key (C) Move up the lists.
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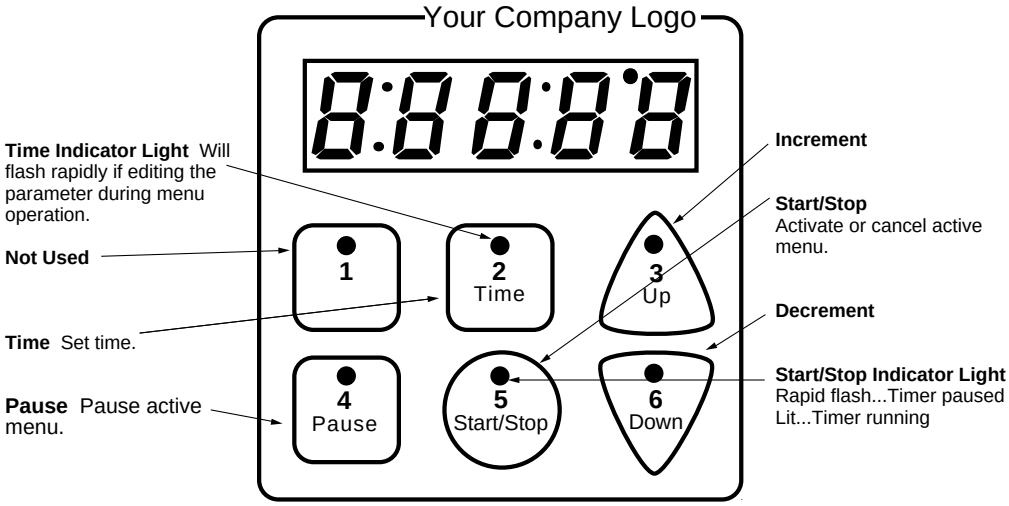
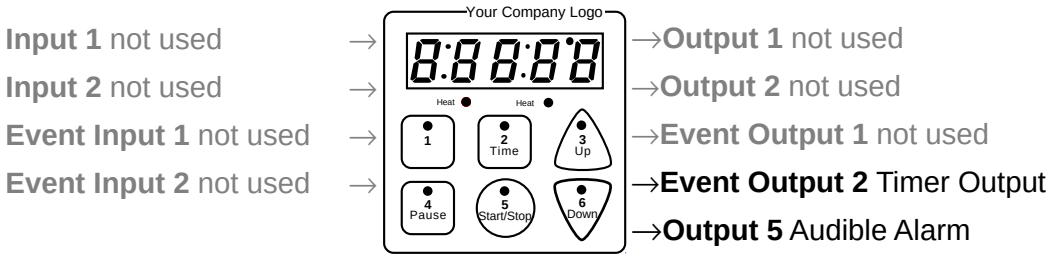
Key Functions in Operation Mode



Summary of Input/Output Functions



Note: For details, see wiring instructions in the *Hardware & Software Setup Guide.*

Configuration Mode Quick Reference

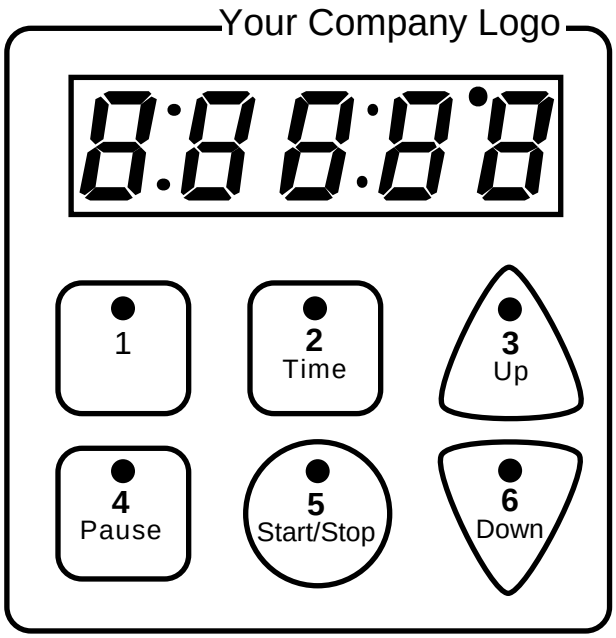
These are the functions, parameters and values included in the Configuration Mode for this application. You must select Application 25 to access them. For directions, see the *Hardware & Software Setup Guide*. The Appendix of that guide includes an explanation of all parameters and values.

Function	Parameter	Value	Your Settings
ETYPE Equipment-Type	APPL Application Number	1 - 28	25
	A_Loc Application Number Security Lock	Yes, No	
	t OUt Timer Output	Yes, No	
SEtUP Setup	t iME Time Display Format	MMM:SS, HH:MM, H:MM:SS	
	Ch irP Key Chirp	On, Off	
	CLoc Real Time Clock Display	Yes, No	
diAG WatHelp Diagnostics	Used for equipment troubleshooting and testing. Not used when programming. See the *Hardware & Software Setup Guide.*		

Step 7 Design a Faceplate Overlay

To complete the installation, you must apply a graphic membrane to the front panel of the controller. The following artwork will help you design and create a membrane for this application. For more dimensions and guidelines, see the *Hardware & Software Setup Guide*.

Suggested End-user Overlay:



This Prototyping and Training Membrane Overlay will help you with the configuration and programming steps. To order it, see the Ordering Information at the back of this guide.

Step 8 Operate the Controller

Summary of Key Functions in Operation Mode

Key	Function
A	Not Used
B	Time
C	Increment
D	Pause
E	Start/Stop
F	Decrement

Startup

Apply power to the controller.

idLE will appear on the display.

If the Real Time Clock Display option is installed and SEtuP / tLoc is set to YES, the time of day will appear on the display.

Set the Timer

1. Press the Time key tiME and then the time value will appear on the display.
2. Press the Up-arrow or Down-arrow key until the value you want appears on the display.
3. Press the Time key again.

   The timer has been set.

   idLE will appear on the display.

Five Second Timeout

When using the Up-arrow or Down-arrow keys to change a value, if you do not press any key for 5 seconds, the timer will automatically be set to the last value on the display and return to idLE.

Run the Timer

1. Set the timer as shown above in “Set the Timer”.
2. To run the timer settings, press the Start/Stop key. The timer will countdown. When the timer is running the Start/Stop key indicator light will be solid on. While the timer is running, its time can be adjusted by pressing the Time key tiME and using the Up-arrow or Down-arrow keys to adjust its value, in five-second intervals. The Time key indicator light will flash while adjustments are being made. Changing the value of the Time while the timer is running will not change the settings of the timer as set in “Set the Timer”.

3 When the timer has completed End will appear on the display, the Start/Stop key indicator light will flash rapidly, and an alarm will sound until the Start/Stop key is pressed to acknowledge and shut off the timer.

4. To run the timer again repeat steps 1 thru 3.

Note: The controller will not respond if Time is set to 0.

Pause a Menu

While the timer is counting down you can pause it by pressing the Pause key. The Pause key indicator light will flash rapidly until you press it again to resume the countdown.

Cancel a Menu

To cancel the active menu, press and hold the Start/Stop key for approximately 2 seconds.

Event Outputs

When EtYPE / t OUt in the Configuration Mode is set to YES, Event Output 2 is on during the countdown of the timer.

Errors

The controller will alert you to errors if they occur. Errors are critical problems that shut down the unit. If an error occurs, an error message will appear on the display. You should switch off the power and call for service.

See the Appendix in the *Hardware & Software Setup Guide* for a summary of errors.

Specifications (1032)

Control Mode
- Single and dual heat channels, PID or on/off.[1]
- Microprocessor-based, programmable, reverse-acting control outputs.
- User-selectable embedded application software defines operation of display, keys, inputs, outputs, timing action.
- One-step auto-tuning, WatHelp diagnostics, WatCurve temperature compensation.

Agency
- CE approved:
  89/336/EEC Electromagnetic Compatibility Directive
  -EN 50081-1: Emissions
  -EN 50082-1: Immunity
  73/23/EEC Low-Voltage Directive
  -EN 60730-1 and EN 60730-2-9: Safety
- NSF Listed, Criteria 2.[5]
- AGA: UL tested to AGA standard Z21.23, UL File #E43684.
- UL and C-UL recognized, UL 197, 873, 991 and CSA standard C22.2-24, File # E43684.

Operator Interface
- Membrane overlay, contamination and water resistant, (supplied by customer).
- LED display, 5-digit, 0.56 in high, red.
- Displays times, temperatures, user prompts and diagnostic codes.
- User-selectable time and temperature display formats.
- Temperature display formats—˚F or ˚C.
- Time display formats—H:MM:SS, HH:MM, or MMM:SS.
- 8 discrete indicator LEDs, red.
- 6 tactile feedback keys.
- Menu-driven operation and manual modes available.
- WatHelp diagnostics.
- Real-time clock option displays time of day.

Accuracy
- Calibration accuracy and sensor conformity[2]: ± 2.0°F for Type J thermocouple and RTD, ± 0.35% of span for Type K and E thermocouples, ±1 LSD, 77°F ± 5°F ambient and rated line voltage of ±10%.
- Accuracy span: 1000°F (540°C) minimum.
- Temperature stability: ± 0.15˚F/˚F (0.15˚C/˚C) change in ambient typical.

Sensors/Inputs
- Contact inputs, TTL compatible with internal pull-up resistor, two available.
- Thermocouple,[3] software selectable Type J, K or E, 32 to 1200°F. (Dual-channel applications require at least one ungrounded thermocouple).
- RTD,[3] 2- or 3-wire, platinum, 100, 500, 1000Ω, at 0°C, software selectable DIN or JIS curves, 0 to 1200°F (3-wire will function as 2-wire).
- Input A/D resolution: 15 bit.

Output Options
- Solid-state relay, 0.4A, with or without contact suppression.
- Switched dc signal, 4.5V to 5.25V, 30mA maximum output, minimum load resistance > 150Ω, non-isolated.

Audible Output Options
- Switched dc signal, 4.5V to 5.25V, 30mA maximum output, minimum load resistance > 150Ω, non-isolated.
- Internal audible alarm, 75dB at 10 cm.

Connectors
- Sensor Input Terminal Strip[4]: RIACON, 6-position, quick-connect.
- Power Supply & Input/Output Terminal[4]: AMP, 15-position, quick-connect.

Power/Line Voltage
- 20.4 to 26.4V~ (ac), 47 to 63Hz.
- 15VA maximum.
- For CE applications, input power must be limited to 15W external to the control.
- Program retention upon power failure via non-volatile memory.
- Battery/real-time clock option: 6-year lithium battery, provides power backup upon power failure, operation resumption after power recovery, ability to display time of day.

Operating Environment
- 32 to 176°F (0 to 80°C), 0 to 90% RH, non-condensing.

Storage Temperature
- -40 to 176°F (-40 to 80°C).

Mechanical
- Case: polycarbonate Lexan with adjustable mounting collar (vertical or horizontal orientation), designed for mounting on 16-, 18-, 20- and 22-gauge panels.
- Internal panel mounting requires a specified panel cutout and four #6-32 studs or equivalent.
- Overall width x height x depth: horizontal - 4.13 in x 3.25 in x 2.00 in; vertical - 3.25 in x 4.13 in x 2.00 in (Assumes mating connectors are attached. Does not include wire bundle space requirements.).
- Vibration: 2g, 10 to 150Hz, applied in any one of three axes.
- Weight: 6.50oz maximum.

Program Storage
- All non-embedded user and factory programs are stored in non-volatile memory. Can be changed by reprogramming.

Sample/Update Rates
- 1 input: 4Hz.
- 2 inputs: 4Hz.
- PID: 1Hz.
- Control outputs: 100Hz.
- Display: 10Hz.

[1] The MiniChef 2000 controller is to be used in systems with an external high temperature limiting device.

[2] Thermocouple lead resistance of 200Ω causes < 1°C error. RTD, 22 gauge wire will not contribute more than 0.086°F error/ft.

[3] Dual channel applications require either two thermocouple sensors or two identical RTD sensor types.

[4] For mating connector information, see Ordering Information Accessory section.

[5] Certified for thermometer accuracy (oven and hot food holding applications from 32°F to 60°F) when used with RTD or type J thermo couple probes.

Ordering Information

(1033)

F 2 H A - _ _ _ 1 - _ _ A A

MINICHEF™ 2000
Cooking controller with numerous food equipment application software sets, single and dual channel on/off or PID temperature regulation, timer and machine-function control, microprocessor-based, programmable, auto-tuning, WatCurve, WatHelp diagnostics, 24V~ (ac) power input, agency approved, flush mounted (membrane faceplate supplied by customer).

Inputs
1 = Dual thermocouple, Type J, K or E
2 = Dual RTD, platinum, 100Ω, curve selectable
3 = Dual RTD, platinum, 500Ω, curve selectable
4 = Dual RTD, platinum, 1000Ω, curve selectable
(Note: All models include two event inputs, switched dc logic signal, non-isolated.)

Output Number 1
1 = Switched dc, 5V nominal, 30mA, non-isolated
2 = Solid-state relay, Form A, 0.4A, without RC suppression
3 = Solid-state relay, Form A, 0.4A, with RC suppression

Output Number 2
1 = Switched dc, 5V nominal, 30mA, non-isolated
2 = Solid-state relay, Form A, 0.4A, without RC suppression
3 = Solid-state relay, Form A, 0.4A, with RC suppression

Event Outputs 1 and 2
1 = 2 event outputs, switched dc, 5V nominal, 30mA, non-isolated

Battery and Real-time Clock
0 = None
1 = Includes battery and real-time clock

Audible Alarm
0 = Alarm signal available at connector, switched dc, 5V nominal, 30mA, non-isolated
1 = Internal alarm included

Software
AA = Standard Food Equipment Application Software Set
XX = Custom Set-up parameters or Made-To-Order custom software. Consult your local Watlow Sales Engineer. Code number assigned by factory.

Ordering Information: Part Numbers & Accessories

MiniChef 2000 Accessories

0836-0442-0000	Sensor Input Mating Connector, (RIACON #31007106), 6-position, quick-connect terminal, screw connection for 28-14 AWG wires, tighten to 7 in/lb
A001-0298-0000	Power Supply and I/O Mating Connector Kit. Includes: – 1 AMP #1-640523-0, 15-position, quick-connect terminal – 15 AMP #641300-1 crimp pins
0238-0679-0000	Prototyping & Training Membrane Overlay, adhesive-backed, 4.75 in x 4.75 in
0830-0479-0000	Prototyping EPROM Extraction Tool, AMP #821980-1
A001-0249-0001	120V~ to 24V~ (ac), stepdown transformer, class 2, quick-connect terminals included
A001-0249-0002	208/240V~ to 24V~ (ac), step-down transformer, class 2, quick-connect terminals included

Recommended Sources of Supply for Miscellaneous Items

DURA-TECH, Inc.
LaCrosse, WI
(608) 781-2570
- *Custom Membrane Faceplates*

AMP, Inc.
Harrisburg, PA
1-800-522-6752
- *Prototyping EPROM Extraction Tool* Part No. 821980-1
- *Pin Crimping Hand Tools* Part No. 90325-1 or 58514-1
- *Pin Extraction Hand Tool* Part No. 455822-2

RIA Electronic, Inc.
Eatontown, NJ
(908) 389-1300
- *RIACON Connectors*

MiniChef 2000 Documentation

WMC2-XUGN-0000	The Complete MiniChef 2000 User Guide
WMC2-XADN-0000	The Complete MiniChef 2000 User Guide on CD
WMC2-XTDN-0000	MiniChef 2000 Tutorial Disk
WMC2-XSGN-0000	Hardware & Software Setup Guide
WMC2-XAGN-0001	Cook-&-Hold Oven Application Guide
WMC2-XAGN-0002	Convection Oven Application Guide
WMC2-XAGN-0003	Deepfat Fryer Application Guide
WMC2-XAGN-0004	Griddle Application Guide
WMC2-XAGN-0005	Timer Application Guide
WMC2-XAGN-0006	Shelf-Timer Application Guide
WMC2-XAGN-0007	Rotisserie Oven Application Guide

Watlow Controls

Watlow Controls is a division of Watlow Electric Mfg. Co., St. Louis, Missouri, a manufacturer of industrial electric heating products since 1922. Watlow begins with a full set of specifications and completes an industrial product that is manufactured totally in-house, in the U.S.A. Watlow products include electric heaters, sensors, controls and switching devices. The Winona operation has been designing solid state electronic control devices since 1962, and has earned the reputation as an excellent supplier to original equipment manufacturers. These OEMs depend upon Watlow Controls to provide compatibly engineered controls that they can incorporate into their products with confidence. Watlow Controls resides in a 100,000-square-foot marketing, engineering and manufacturing facility in Winona, Minnesota.

Technical Assistance

If you encounter a problem with your Watlow controller, refer to the Troubleshooting Chart in this guide. Also review all of your configuration information for each step of the setup to verify that your selections are consistent with your applications.

If the problem persists after checking all the steps, you can get technical assistance by calling Watlow Controls at (507) 454-5300, between 7 a.m. and 5 p.m. CST, and asking for an applications engineer. When you call have the following information on hand: the controller's part number, date code, serial number, software revision number, and application number. Much of this information is available on the controller case. All of this information is also available via the MINICHEF 2000 main display by accessing the WatHelp Diagnostics Function under d iAG in the Configuration Mode.

We Value Your Feedback

Your comments and suggestions on this manual are welcome. Please send them to, Technical Writer, Watlow Controls, 1241 Bundy Blvd., P.O. Box 5580, Winona, MN 55987-5580 or call (507) 454-5300 or fax (507) 452-4507.

Contact

- Phone: (507) 454-5300.
- Fax: (507) 452-4507.
- For technical support, ask for an Applications Engineer.
- To place an order, ask for Customer Service.
- To discuss a custom option, ask for the MINICHEF 2000 Product Manager.

Warranty

The MINICHEF 2000 is warranted to be free of defects in material and workmanship for 36 months after delivery to the first purchaser for use, providing that the unit has not been misapplied. Since Watlow has no control over its use, or misuse, we cannot guarantee against failure. Watlow's obligations hereunder, at Watlow's option, are limited to replacement or refund of purchase price of a unit which upon examination proves to be defective within the warranty period. This warranty does not apply to damage resulting from transportation, alteration, misuse, or abuse.

Returns

- Call or fax Customer Service for a Return Material Authorization (RMA) number before returning a control.
- Put the RMA number on the shipping label, and also on a description of the problem.
- 20% of net price restocking charge applies to all standard units returned to stock.

Note: All documentation of the MINICHEF 2000 is subject to change without notice.

Watlow Controls, 1241 Bundy Blvd., P.O. Box 5580, Winona, MN U.S.A. 55987-5580 Phone: (507) 454-5300, Fax: (507) 452-4507